

Amendments to the Claims

Please cancel Claims 3, 18, 28, 35, 50 and 60 without prejudice to or disclaimer of the subject matter recited therein.

Please amend Claims 1, 13, 24, 33, 45, 56, 65, 66, 70, 71 and 75 to read as follows.

1. (Currently amended) A method of sterilizing and/or sanitizing a container, said method comprising the steps of:

generating a sterilant vapor, the sterilant being maintained in a ~~completely~~ vapor state;

positioning a nozzle through an opening in the container and to a position in a range from just below a shoulder of the container to no closer than 15 mm from any internal surface of the container that is perpendicular to a principal direction of flow of sterilant vapor from the nozzle;

discharging the generated sterilant vapor through the nozzle and into the container; and

purging the container of the discharged sterilant with gas from the nozzle.

2. (Original) A method according to Claim 1, wherein after said positioning step, the nozzle is positioned no closer than 15 mm from the bottom of the container.

Claim 3 (cancelled)

4. (Original) A method according to Claim 1, wherein after said positioning step, the nozzle is inserted within $1/6$ and $5/6$ the height of the container.
5. (Original) A method according to Claim 1, wherein the sterilant comprises hydrogen peroxide.
6. (Original) A method according to Claim 1, further comprising the step of heating the nozzle.
7. (Original) A method according to Claim 1, wherein the container is formed at least in part of PET.
8. (Original) A method according to Claim 1, wherein said purging step comprises forcing heated gas into the container through the nozzle.
9. (Original) A method according to Claim 1, wherein the nozzle has a diameter no greater than one-half the diameter of the opening of the container.

10. (Original) A method according to Claim 1, wherein the sterilant vapor used in said discharging step and a gas used in said purging step are at temperatures no greater than 160° F.

11. (Original) A method according to Claim 1, wherein said purging step is effected no longer than 30 seconds from said discharging step.

12. (Original) A method according to Claim 1, further comprising the step of positioning the nozzle above the opening of the container and discharging the sterilant vapor onto the exterior of the container.

13. (Currently amended) A method of sterilizing and/or sanitizing a container, the container having an opening of a predetermined diameter, a ratio of the interior surface area of the container to the cross-sectional area of the opening being at least 7.5, said method comprising the steps of:

generating a sterilant vapor, the sterilant being maintained in a **completely** vapor state;

positioning a nozzle through the opening in the container, the nozzle having a diameter no greater than one-half the predetermined diameter of the opening of the container, to a position in a range from just below a shoulder of the container to no closer than 15 mm from any internal surface of the container that is perpendicular to a principal direction of flow of sterilant vapor from the nozzle;

discharging the generated sterilant vapor through the nozzle and into the container; and

purging the container of the discharged sterilant with gas from the nozzle.

14. (Original) A method according to Claim 13, wherein the sterilant comprises hydrogen peroxide.

15. (Original) A method according to Claim 13, further comprising the step of heating the nozzle.

16. (Original) A method according to Claim 13, wherein the container is formed at least in part of PET.

17. (Original) A method according to Claim 13, wherein said purging step comprises forcing heated gas into the container through the nozzle.

Claim 18 (cancelled)

19. (Original) A method according to Claim 13, wherein after said positioning step the nozzle is inserted within $1/6$ and $5/6$ the height of the container.

20. (Original) A method according to Claim 13, wherein the sterilant vapor used in said discharging step and a gas used in said purging step are at temperatures no greater than 160° F.

21. (Original) A method according to Claim 13, wherein said purging step is effected no longer than 30 seconds from said discharging step.

22. (Original) A method according to Claim 13, further comprising the step of positioning the nozzle above the opening of the container and discharging the sterilant vapor onto the exterior of the container.

23. (Original) A method according to Claim 13, wherein the predetermined diameter of the opening of the container is no more than one-half the maximum diameter of the container.

24. (Currently amended) A method of sterilizing and/or sanitizing a PET container, said method comprising the steps of:

generating a sterilant vapor having a temperature no greater than 160° F, the sterilant being maintained in a ~~completely~~ vapor state;

positioning a nozzle through an opening in the container;

discharging the generated sterilant vapor through the nozzle and into the container; and

purging the container of the discharged sterilant with a heated gas from the nozzle and having a temperature no greater than 160° F, wherein said purging step is completed no longer than 30 seconds from a beginning of said discharging step.

25. (Original) A method according to Claim 24, wherein the sterilant comprises hydrogen peroxide.

26. (Original) A method according to Claim 24, further comprising the step of heating the nozzle.

27. (Original) A method according to Claim 24, wherein the container is formed in part of PET.

Claim 28 (cancelled)

29. (Original) A method according to Claim 24, wherein in said positioning step, the nozzle is disposed no closer than 15 mm from any internal surface of the container that is perpendicular to the direction of flow from the nozzle.

30. (Original) A method according to Claim 24, wherein after said positioning step the nozzle is inserted within $1/6$ and $5/6$ the height of the container.

31. (Original) A method according to Claim 24, wherein the opening of the container has a predetermined diameter, a ratio of the interior surface area of the container to the cross-sectional area of the opening is at least 7.5, and the nozzle has a diameter no greater than one-half the predetermined diameter of the opening of the container.

32. (Original) A method according to Claim 24, further comprising the step of positioning the nozzle above the opening of the container and discharging the sterilant vapor onto the exterior of the container.

33. (Currently amended) In combination, a container and an apparatus for sterilizing and/or sanitizing the container, said apparatus comprising:

a generator of sterilant vapor, the sterilant being maintained in a ~~completely~~ vapor state;

a nozzle communicating with said generator;

a positioning mechanism for positioning said nozzle through an opening in the container and to a position in a range from just below a shoulder of the container to no closer than 15 mm from any internal surface of the container that is perpendicular to the direction of flow of sterilant vapor from the nozzle; and

a controller for controlling discharging of the generated sterilant vapor through said nozzle and into the container and purging of the container of the discharged sterilant with gas from said nozzle.

34. (Previously presented) A combination according to Claim 33, wherein said positioning mechanism positions the nozzle no closer than 15 mm from the bottom of the container.

Claim 35 (cancelled)

36. (Previously presented) A combination according to Claim 33, wherein said positioning mechanism inserts the nozzle within $1/6$ and $5/6$ the height of the container.

37. (Previously presented) A combination according to Claim 33, wherein the sterilant comprises hydrogen peroxide.

38. (Previously presented) A combination according to Claim 33, further comprising a heater for heating said nozzle.

39. (Previously presented) A combination according to Claim 33, wherein the container is formed at least in part of PET.

40. (Previously presented) A combination according to Claim 33, wherein in purging, said controller controls forcing of heated gas into the container through said nozzle.

41. (Previously presented) A combination according to Claim 33, wherein the opening of the container has a predetermined diameter, a ratio of the interior surface area of the container to the cross-sectional area of the opening is at least 7.5, and said nozzle has a diameter no greater than one-half the diameter of the opening of the container.

42. (Previously presented) A combination according to Claim 33, wherein said controller controls the sterilant vapor and a purge gas to be at temperatures no greater than 160° F.

43. (Previously presented) A combination according to Claim 33, wherein said controller controls purging to be effected no longer than 30 seconds from discharging of the sterilant.

44. (Previously presented) A combination according to Claim 33, wherein said controller further controls positioning of the nozzle above the opening of the container and discharging of the sterilant vapor onto the exterior of the container.

45. (Currently amended) In combination, a container and an apparatus for sterilizing and/or sanitizing the container, the container having an opening of a predetermined diameter, a ratio of the interior surface area of the container to the cross-sectional area of the opening being at least 7.5, said apparatus comprising:

a generator of sterilant vapor, the sterilant being maintained in a **completely** vapor state;

a nozzle communicating with said generator, said nozzle having a diameter no greater than one-half the predetermined diameter of the opening of the container, to a position in a range from just below a shoulder of the container to no closer than 15 mm from any internal surface of the container that is perpendicular to a principal direction of flow of sterilant vapor from said nozzle;

a positioning mechanism for positioning said nozzle through the opening in the container; and

a controller for controlling discharging of the generated sterilant vapor through said nozzle and into the container and purging of the container of the discharged sterilant with gas from said nozzle.

46. (Previously presented) A combination according to Claim 45, wherein the sterilant comprises hydrogen peroxide.

47. (Previously presented) A combination according to Claim 45, further comprising a heater for heating said nozzle.

48. (Previously presented) A combination according to Claim 45, wherein the container is formed at least in part of PET.

49. (Previously presented) A combination according to Claim 45, wherein in purging, said controller controls forcing of heated gas into the container through said nozzle.

Claim 50 (cancelled)

51. (Previously presented) A combination according to Claim 45, wherein said positioning mechanism inserts the nozzle within $1/6$ and $5/6$ of the height of the container.

52. (Previously presented) A combination according to Claim 45, wherein said controller controls the sterilant vapor and a flush gas to be at temperatures no greater than 160° F.

53. (Previously presented) A combination according to Claim 45, wherein said controller controls purging to be effected no longer than 30 seconds from discharging of the sterilant.

54. (Previously presented) A combination according to Claim 45, wherein said controller further controls positioning of the nozzle above the opening of the container and discharging of the sterilant vapor onto the exterior of the container.

55. (Previously presented) A combination according to Claim 45, wherein the predetermined diameter of the opening of the container is no more than one-half the maximum diameter of the container.

56. (Currently amended) In combination, a PET container and an apparatus for sterilizing and/or sanitizing the PET container, said apparatus comprising:

a generator of sterilant vapor having a temperature no greater than 160° F, the sterilant being maintained in a ~~completely~~ vapor state;

a nozzle communicating with said generator;

a positioning mechanism for positioning said nozzle through an opening in the container; and

a controller for controlling discharging of the generated sterilant vapor through said nozzle and into the container and purging of the container of the discharged sterilant with a heated gas from said nozzle and having a temperature no greater than 160° F, wherein said controller controls purging to be completed no longer than 30 seconds from discharging of the sterilant.

57. (Previously presented) A combination according to Claim 56, wherein the sterilant comprises hydrogen peroxide.

58. (Previously presented) A combination according to Claim 56, further comprising a heater for heating said nozzle.

59. (Previously presented) A combination according to Claim 56, wherein the container is formed at least in part of PET.

Claim 60 (cancelled)

61. (Previously presented) A combination according to Claim 56, wherein said positioning mechanism positions said nozzle to a position no closer than 15 mm from any internal surface of the container that is perpendicular to a principle direction of flow of sterilant vapor from the nozzle.

62. (Previously presented) A combination according to Claim 56, wherein said positioning mechanism inserts the nozzle within $1/6$ and $5/6$ the height of the container.

63. (Previously presented) A combination according to Claim 56, wherein the opening of the container has a predetermined diameter, a ratio of the interior surface area of the container to the cross-sectional area of the opening is at least 7.5, and said nozzle has a diameter no greater than one-half the diameter of the opening of the container.

64. (Previously presented) A combination according to Claim 56, wherein said controller further controls positioning of the nozzle above the opening of the container and discharging of the sterilant vapor onto the exterior of the container.

65. (Currently amended) A method of sterilizing and/or sanitizing a container having a volume b (l), said method comprising the steps of:

generating hydrogen peroxide sterilant vapor having a temperature T_1 (°F), the sterilant being maintained in a ~~completely~~ vapor state;

discharging a mass a (mg) of the generated sterilant vapor into the container; and

purging the container of the discharged sterilant with heated gas having a volume c (l) and a temperature T_2 (°F), wherein said generating, discharging and purging steps are controlled so as to effect a reduction of ~~Bacillus~~ Bacillus spores in the container by a predetermined amount X (log) by satisfying the following equation

$$X = (0.138 \times a/b) + (0.066 \times T_1) - (0.00083 \times c/b) + (0.021 \times T_2) + (0.008347 \times d) - 11.357,$$

wherein d is the ambient relative humidity (%RH).

66. (Currently amended) A method according to Claim 65, wherein the spores are ~~Bacillus subtilis~~ Bacillus subtilis var. ~~globigii~~ globigii.

67. (Original) A method according to Claim 65, wherein the predetermined reduction amount (X) of the spores in the container equals at least 6 log.

68. (Original) A method according to Claim 65, wherein the residual sterilant is reduced in said purging step to a desired level (Z) (mg/l) by satisfying the following equation:

$$Z = (0.030 \times a/b) - (0.043 \times T_1) - (0.040 \times c/b) - (0.075 \times T_2) + 15.747.$$

69. (Original) A method according to Claim 65, wherein the sterilant comprises 35% hydrogen peroxide.

70. (Currently amended) A method of sterilizing and/or sanitizing a container having a volume b (l), said method comprising the steps of:

generating a hydrogen peroxide sterilant vapor having a temperature T_1 (°F), the sterilant being maintained in a ~~completely~~ vapor state;

discharging a mass a (mg) of the generated sterilant vapor into the container; and

purging the container of the discharged sterilant with heated gas having a volume c (l) and a temperature T_2 (°F), wherein said generating, discharging and purging steps are controlled so as to effect a reduction of yeast ascospores in the container by a predetermined amount Y (log) by satisfying the following equation

$$Y = (0.063 \times a/b) + (0.023 \times T_1) - (0.00036 \times c/b) + (0.052 \times T_2) + (0.009 \times d) - 3.611,$$

wherein d is the ambient relative humidity (%RH).

71. (Currently amended) A method according to Claim 70, wherein the ascospores are of the yeast ~~Saccharomyces cerevisiae~~ Saccharomyces cerevisiae.

72. (Original) A method according to Claim 70, wherein the predetermined reduction amount (Y) of the ascospores in the container equals at least 5 log.

73. (Original) A method according to Claim 70, wherein the residual sterilant is reduced in said purging step to a desired level (mg/l) (Z) by satisfying the following equation:

$$Z = (0.030 \times a/b) - (0.043 \times T_1) - (0.040 \times c/b) - (0.075 \times T_2) + 15.74.$$

74. (Original) A method according to Claim 70, wherein the sterilant comprises 35% hydrogen peroxide.

75. (Currently amended) A method of sterilizing and/or sanitizing a non-heat-set PET container having a volume b (l), said method comprising the steps of:

generating hydrogen peroxide sterilant vapor having a temperature T_1 ($^{\circ}\text{F}$),
the sterilant being maintained in a ~~completely~~ vapor state;

discharging a mass a (mg) of the generated sterilant vapor into the
container; and

purging the container of the discharged sterilant with heated gas having a
volume c (l) and a temperature T_2 ($^{\circ}\text{F}$), wherein said generating, discharging and purging
steps are controlled so as to effect a reduction of the sterilant in the container to a
predetermined amount Z (mg/l) at 24 hours after said purging step by satisfying the
following equation

$$Z = (0.030 \times a/b) - (0.043 \times T_1) - (0.040 \times c/b) - (0.075 \times T_2) + 15.747.$$

76. (Original) A method according to Claim 75, wherein the sterilant
comprises 35% hydrogen peroxide.

77. (Original) A method according to Claim 75, wherein the
predetermined amount is 0.5 mg/l at 24 hours after said purging step.